

A preliminary study on CO₂ removal from PFBC flue gas using aqueous potassium carbonate solution

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PFBC (pressurized fluidized-bed combustion) integrated with Benfield carbonization could be an alternative power technology due to its CO₂ emission reduction as well as compact size. Benfield process uses aqueous hot potassium carbonate promoted by diethanolamine (DEA) as CO₂-absorbing medium. However, because DEA suffer massive degradation during thermally regenerated cyclical process, thermochemically stable rate promoter should be suggested.

In this study, a preliminary investigation was conducted to improve hot potassium carbonate process. Optimum reaction condition including CO₂ partial pressure, reaction temperatures for temperature swing was explored by measurement of vapor-liquid equilibrium. The effects of additives on reaction kinetics were investigated using stirred-cell reactor for both promoter (inorganic or amine) and corrosion inhibitor. The experimental results could enhance CO₂ capture performance resulting in the increases of generating efficiency.